

### ABSTRACT OF THE DISCLOSURE

The present invention relates to a method for generating and apparatus for employing code families having desirable correlation properties. Regardless of code length, maximum autocorrelation of the codes is 4 for any nonzero offset and maximum cross-correlation of any two codes from a code family is 4 for any offset. The codes can be used in impulse radio systems and non-impulse radio systems including CDMA, TDMA, FDMA, OFDM and various other frequency hopping and direct sequence systems. The codes can be used to specify various impulse radio and non-impulse radio signal characteristics including pulse position in time, amplitude, width, type, phase, phase difference, frequency, spreading code, etc. The codes have the unique property that they can specify as many as two components in which a signal is not present. A method of code compression is provided.